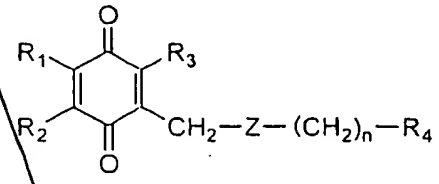
CLAIMS

1. An NF-κB inhibitor comprising as an active ingredient a benzoquinone derivative represented by the following general formula (1):



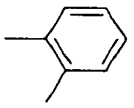
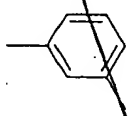
(I)

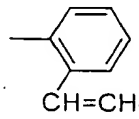
wherein

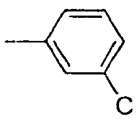
R_1, R_2, and R_3 are each independently a hydrogen atom, an alkyl group having 1 to 5 carbons, or an alkoxy group having 1 to 5 carbons;

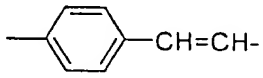
R_4 is a hydrogen atom, a hydroxymethyl group, an alkyl group, or a carboxyl group which is optionally esterified or amidated;

Z is







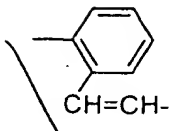
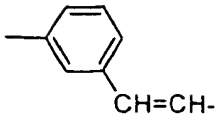
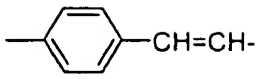
and, n is an integer from 0 to 6,

or its hydroquinone form, or a pharmaceutically acceptable salt thereof.

2. The NF-κB inhibitor according to claim 1 ~~in which~~ wherein R_1 and R_2 are a hydrogen atom, a methyl group, or a methoxy group.

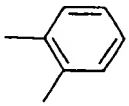
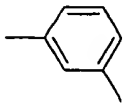
3. The NF-κB inhibitor according to claim 1 ~~or 2~~ ~~in which~~ wherein R_3 is a hydrogen atom or a methyl group.

4. The NF-κB inhibitor according to claim 1, ~~2, or 3~~ ~~in which~~ wherein Z is

and n is an integer 0.

5. The NF-κB inhibitor according to claim 1, ~~2, or 3 in which~~ wherein Z is


and n is an integer 1, 2, or 3.

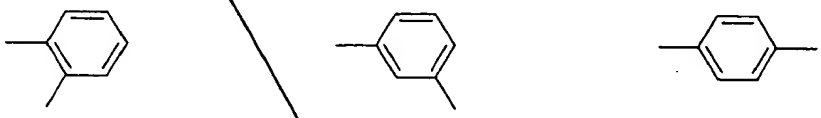
6. The NF-κB inhibitor according to ~~any one of~~ claim$ 1 ~~to 5 in which~~ wherein R_4 is a group $-COOR_5$ wherein R_5 is a hydrogen atom, an optionally substituted alkyl group having 1 to 8 carbons, an optionally substituted phenyl group, or an optionally substituted aralkyl group having 7 to 11 carbons.

7. The NF-κB inhibitor according to ~~any one of~~ claim$ 1 ~~to 5 in which~~ wherein R_4 is a group $-CONR_6R_7$ wherein R_6 and R_7 are each independently a hydrogen atom, an optionally substituted alkyl group having 1 to 8 carbons, an optionally substituted bicyclic unsaturated or partially saturated hydrocarbon ring group having 9 to 11 carbons, an optionally substituted heterocyclic group, an optionally substituted phenyl group, an optionally substituted aralkyl group having 7 to 11 carbons, or a heteroaryl-C_1-C_3-alkyl group, or R_6 and R_7, together with the nitrogen atom to which they are attached, represent a heterocyclic group which may further contain a nitrogen, oxygen, and/or sulfur atom.

8. The NF-κB inhibitor according to ~~any one of~~ claim$ 1 ~~to 5 in which~~ wherein R_4 is a group $-CONR_6R_7$ wherein R_6 and R_7, together with the nitrogen atom to which they are attached, represent a 5- to 10-membered optionally

substituted, nitrogen-containing heterocyclic group which may contain, in addition to the carbon and nitrogen atom, 1 to 3 heteroatoms selected from the group consisting of a nitrogen, oxygen and sulfur atom, the carbon atom on said cyclic group being optionally a ketone form or the sulfur atom on said cyclic group being optionally an oxide form.

9. The NF-κB inhibitor according to claim 1~~, 6, 7, or 8 in which~~ wherein R_1 and R_2 are a methyl group or a methoxy group; R_3 is a methyl group: R_4 is a carboxyl group which is optionally esterified or amidated; Z is



and n is an integer 1, 2, or 3.

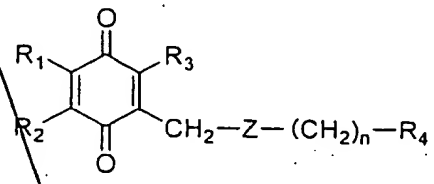
10. The NF-κB inhibitor according to ~~any one of~~ claim~~s~~ 1 ~~to 9 which is a~~ wherein the suppressing agent for the gene expression of one or more substances is selected from the group consisting of IL-1, TNF-α, IL-2, IL-6, IL-8, iNOS, granulocyte colony-stimulating factor, interferon-β, ICAM-1, VCAM-1, ELAM-1, major histocompatibility system class I, major histocompatibility system class II, β2-microglobulin, immunoglobulin light chain, serum amyloid A, angiotensinogen, complement B, complement C4, c-myc, HIV, HTLV-1, SV40, CMV, and adenovirus.

11. The NF-κB inhibitor according to ~~any one of~~ claim~~s~~ 1 ~~to 9~~ which is a preventive or therapeutic agent for inflammatory diseases.

12. The NF-κB inhibitor according to ~~any one of~~ claim~~s~~ 1 ~~to 9~~ which is a preventive or therapeutic agent for autoimmune diseases.

13. The NF-κB inhibitor according to any one of claims 1 to 9 which is a preventive or therapeutic agent for viral diseases.

14. A preventive or therapeutic agent for diseases caused by the activation of NF-κB comprising as an active ingredient a benzoquinone derivative represented by the following general formula (1):



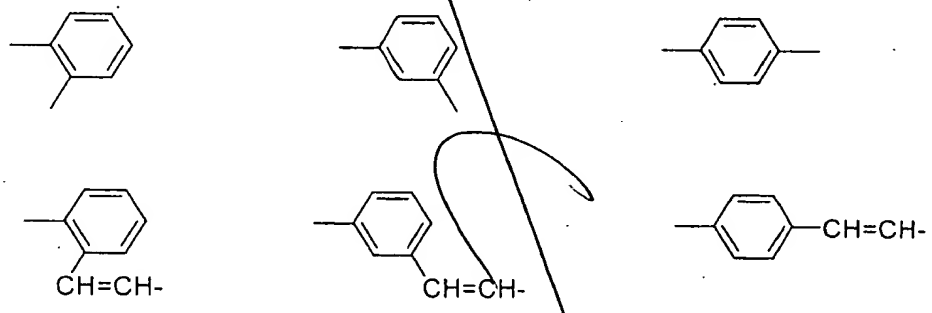
(I)

wherein

R_1, R_2, and R_3 are each independently a hydrogen atom, an alkyl group having 1 to 5 carbons, or an alkoxy group having 1 to 5 carbons;

R_4 is a hydrogen atom, a hydroxymethyl group, an alkyl group, or a carboxyl group which is optionally esterified or amidated;

Z is



and, n is an integer from 0 to 6,

or its hydroquinone form, or a pharmaceutically acceptable salt thereof.

15. A novel compound selected from:

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]morpholine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]thiomorpholine S-oxide,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-

benzoquinon-2-ylmethyl)phenyl]propionyl]thiomorpholine S-dioxide,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]piperidine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]dimethylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]isopropylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]ethanolamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]benzylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]phenethylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]morpholine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]thiomorpholine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]piperidine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]dimethylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]isopropylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]ethanolamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]benzylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]phenethylamine,

N-[3-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]piperidine,

N-[3-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]thiomorpholine,

N-[3-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]morpholine,

N-[3-[3-(5,6-dimethoxy-3-methyl-1,4-

benzoquinon-2-ylmethyl)phenyl]propionyl]isopropylamine,
3-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acrylic acid,
N-[3-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]piperidine,
N-[3-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]morpholine,
N-[3-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]isopropylamine,
N-[3-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]thiomorpholine,
N-[3-[4-(3,5,6-trimethyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]isopropylamine,
N-[3-[4-(3,5,6-trimethyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]piperidine,
N-[3-[4-(3,5,6-trimethyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]morpholine,
N-[3-[3-(3,5,6-trimethyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]isopropylamine,
N-[3-[3-(3,5,6-trimethyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]piperidine,
3-[2-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acrylic acid,
N-[3-[2-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]acryloyl]thiomorpholine,
3-[2-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionic acid,
N-[3-[2-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]piperidine,
N-[3-[2-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]morpholine,
N-[3-[2-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]thiomorpholine,
N-[3-[2-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]isopropylamine,
N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-(s)-2-

C3 cont

(methoxymethyl)pyrrolidine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]isonipecotamide,

C3 cont

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-4-methylpiperidine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-2-methylpiperidine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-3-methylpiperidine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-4-methoxyaniline,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-2-hydroxyaniline,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-3,4-dimethoxyaniline,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-D,L-alaninol,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-D,L-pipecolic acid ethylester,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-L-prolinamide,

4-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl] aminophenylacetonitrile,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-4-pentylaniline,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-(s)-(-)-1-phenylethylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-

benzoquinon-2-ylmethyl)phenyl]propionyl]-(R)-(+)-1-phenylethylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-1,3-dimethylbutylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]cycloheptylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-3,5-dimethylpiperidine,

1-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-4-ethoxycarbonylpiperazine,

1-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-4-phenylpiperazine,

1-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-4-hydroxy-4-phenylpiperidine,

1-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-4-(4-chlorophenyl)-4-hydroxypiperidine,

1-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-4-(2-methoxyphenyl)piperazine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-6,7-dimethoxy-1,2,3,4-tetrahydroisoquinoline,

4-acetyl-4-phenyl-1-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]piperidine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-1,2,3,4-tetrahydroisoquinoline,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]isoamylamine,

N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-

benzoquinon-2-ylmethyl)phenyl]propionyl]cyclohexylamine,
N-[3-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]propionyl]-4-hydroxyaniline,
4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)benzoic acid,
N-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)benzoyl]morpholine,
N-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)benzoyl]isopropylamine,
N-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)benzoyl]piperidine,
N-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)benzoyl]thiomorpholine,
3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)benzoic acid,
N-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)benzoyl]isopropylamine,
N-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)piperidine,
N-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)morpholine,
N-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)thiomorpholine,
4-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]-n-butyric acid,
N-[4-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]butanoyl]morpholine,
N-[4-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]butanoyl]thiomorpholine,
N-[4-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]butanoyl]piperidine,
N-[4-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]butanoyl]isopropylamine,
4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenylacetic acid,
N-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-

C3 cont

ylmethyl)phenylacetyl]morpholine,

N-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenylacetyl]piperidine,

N-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenylacetyl]thiomorpholine,

N-[4-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenylacetyl]isopropylamine,

3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenylacetic acid,

N-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenylacetyl]piperidine,

N-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenylacetyl]thiomorpholine,

N-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenylacetyl]morpholine,

N-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenylacetyl]morpholine,

4-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]-n-butyric acid,

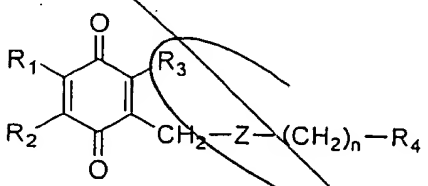
N-[4-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]butanoyl]piperidine,

N-[4-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]butanoyl]thiomorpholine,

N-[4-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]butanoyl]morpholine, and

N-[4-[3-(5,6-dimethoxy-3-methyl-1,4-benzoquinon-2-ylmethyl)phenyl]butanoyl]isopropylamine.

16. An ~~inhibitor of~~ inhibitor composition TNF-α production comprising as an active ingredient a benzoquinone derivative represented by the following general formula (1):



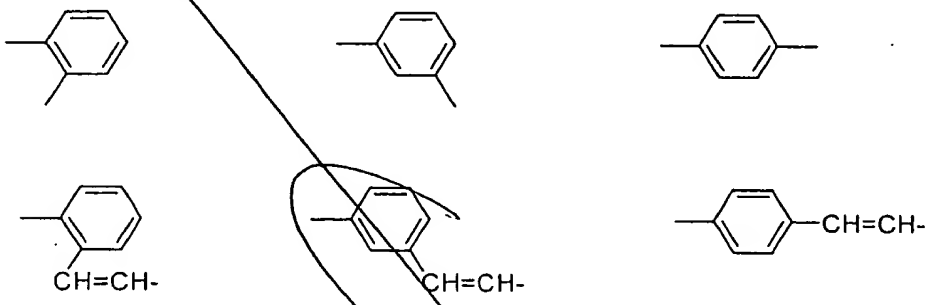
(I)

wherein

R_1, R_2, and R_3 are each independently a hydrogen atom, an alkyl group having 1 to 5 carbons, or an alkoxy group having 1 to 5 carbons;

R_4 is a hydrogen atom, a hydroxymethyl group, an alkyl group, or a carboxyl group which is optionally esterified or amidated;

Z is



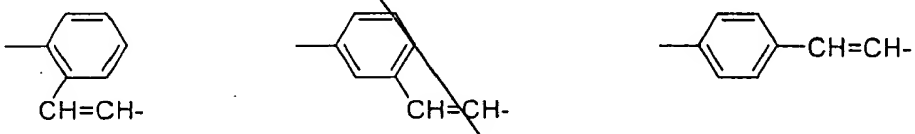
and, n is an integer from 0 to 6,

or its hydroquinone form, or a pharmaceutically acceptable salt thereof.

17. The ~~inhibitor of~~ TNF-α production according to claim 16 ~~in which~~ wherein R_1 and R_2 are a hydrogen atom, a methyl group, or a methoxy group.

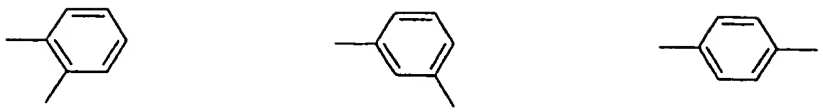
18. The ~~inhibitor of~~ TNF-α production according to claim 16 ~~or 17 in which~~ wherein R_3 is a hydrogen atom or a methyl group.

19. The ~~inhibitor of~~ TNF-α production according to claim 16, ~~17, or 18 in which~~ wherein Z is



and n is an integer 0.

20. The ~~inhibitor of~~ TNF-α production according to claim 16, 17, ~~or 18 in which~~ wherein Z is



and n is an integer 1, 2, or 3.

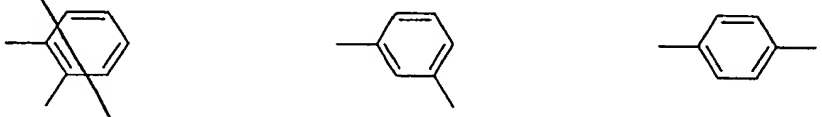
21. The ~~inhibitor of~~ TNF-α production according to ~~any one of~~ claim~~s~~ 16 ~~to 20 in which~~ R_4 is a group $-COOR_5$ wherein R_5 is a hydrogen atom, an optionally substituted alkyl group having 1 to 8 carbons, an optionally substituted phenyl group, or an optionally substituted aralkyl group having 7 to 11 carbons.

22. The ~~inhibitor of~~ TNF-α production according to ~~any one of~~ claim~~s~~ 16 ~~to 20 in which~~ R_4 is a group $-CONR_6R_7$ wherein R_6 and R_7 are each independently a hydrogen atom, an optionally substituted alkyl group having 1 to 8 carbons, an optionally substituted bicyclic unsaturated or partially saturated hydrocarbon ring group having 9 to 11 carbons, an optionally substituted heterocyclic group, an optionally substituted phenyl group, an optionally substituted aralkyl group having 7 to 11 carbons, or a heteroaryl-C_1-C_3-alkyl group, or R_6 and R_7, together with the nitrogen atom to which they are attached, represent a heterocyclic group which may further contain a nitrogen, oxygen, and/or sulfur atom.

23. The ~~inhibitor of~~ TNF-α production according to ~~any one of~~ claim~~s~~ 16 ~~to 20 in which~~ R_4 is a group $-CONR_6R_7$ wherein R_6 and R_7, together with the nitrogen atom to which they are attached, represent a 5- to 10-membered optionally substituted, nitrogen-containing heterocyclic group which may contain, in addition to the carbon and nitrogen atom, 1 to 3 heteroatoms selected from the group consisting of a nitrogen, oxygen and sulfur atom, the carbon atom on said cyclic group being optionally a ketone form or the sulfur atom on said cyclic group being optionally an oxide form.

24. The ~~inhibitor of~~ TNF-α production according to

claim 16, ~~21, 22, or 23 in which~~ wherein R_1 and R_2 are a methyl group or a methoxy group; R_3 is a methyl group: R_4 is a carboxyl group which is optionally esterified or amidated; Z is



and n is an integer 1, 2, or 3.

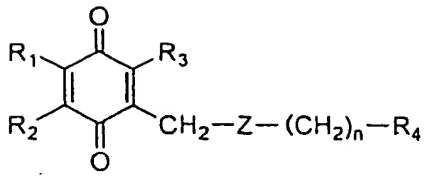
25. The ~~inhibitor of~~ TNF-α production inhibitor composition according to ~~any one of~~ claim~~s~~ 16 ~~to 24 which is a~~ wherein the suppressing agent for the gene expression of one or more substances is selected from the group consisting of IL-1, TNF-α, IL-2, IL-6, IL-8, iNOS, granulocyte colony-stimulating factor, interferon-β, ICAM-1, VCAM-1, ELAM-1, plasminogen activator-inhibiting factor I, major histocompatibility system class I, major histocompatibility system class II, β2-microglobulin, immunoglobulin light chain, serum amyloid A, angiotensinogen, complement B, complement C4, c-myc, HIV, HTLV-1, SV40, CMV, and adenovirus.

26. The ~~inhibitor of~~ TNF-α production inhibitor composition according to ~~any one of~~ claim~~s~~ 16 ~~to 24~~ which is a preventive or therapeutic agent for inflammatory diseases.

27. The ~~inhibitor of~~ TNF-α production inhibitor composition according to ~~any one of~~ claim~~s~~ 16 ~~to 24~~ which is a preventive or therapeutic agent for autoimmune diseases.

28. The ~~inhibitor of~~ TNF-α production inhibitor composition according to ~~any one of~~ claim~~s~~ 16 ~~to 24~~ which is a preventive or ~~therapeutic agent for viral diseases.~~

29. A preventive or therapeutic agent for diseases caused by the excessive production of TNF-α comprising as an active ingredient a benzoquinone derivative represented by the following general formula (1):



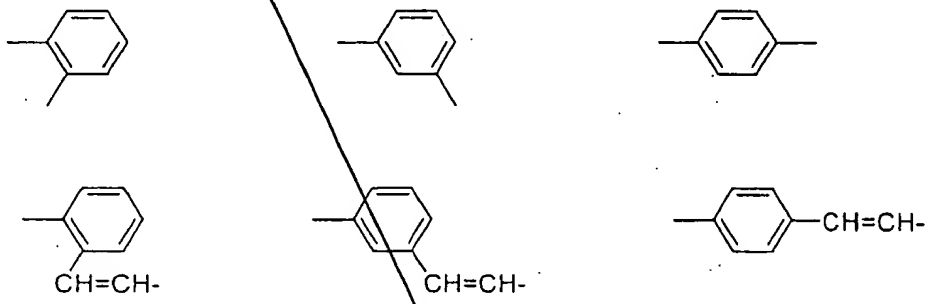
(I)

wherein

R_1, R_2, and R_3 are each independently a hydrogen atom, an alkyl group having 1 to 5 carbons, or an alkoxy group having 1 to 5 carbons;

R_4 is a hydrogen atom, a hydroxymethyl group, an alkyl group, or a carboxyl group which is optionally esterified or amidated;

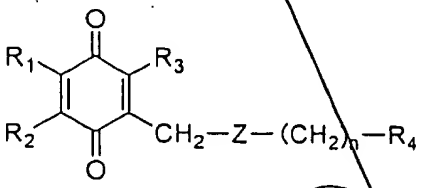
Z is



and, n is an integer from 0 to 6,

or its hydroquinone form, or a pharmaceutically acceptable salt thereof.

30. A benzoquinone derivative represented by the following general formula (1):



(I)

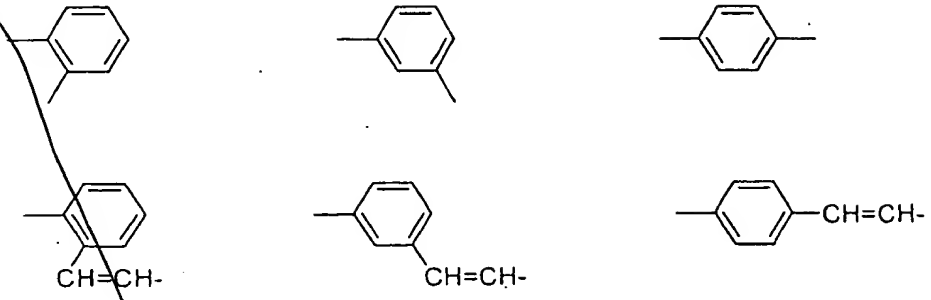
wherein

R_1, R_2, and R_3 are each independently a hydrogen atom, an alkyl group having 1 to 5 carbons, or an alkoxy group having 1 to 5 carbons;

R_4 is a hydrogen atom, a hydroxymethyl group, an alkyl group, or a carboxyl group which is optionally

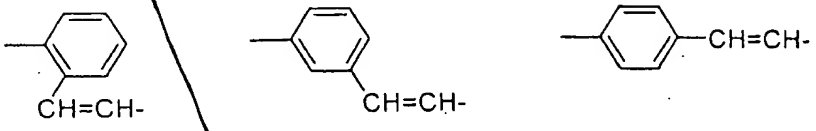
esterified or amidated;

Z is

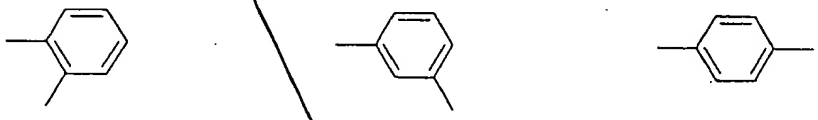


and, n is an integer from 0 to 6,

provided that when Z is



n is not 0, and when Z is



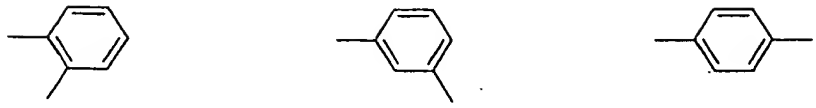
n is neither 0 nor 2,

or its hydroquinone form, or a pharmaceutically acceptable salt thereof.

31. The benzoquinone derivative according to claim 30 ~~in which~~ wherein R_1 and R_2 are a hydrogen atom, a methyl group, or a methoxy group, or its hydroquinone form or a pharmaceutically acceptable salt thereof.

32. The benzoquinone derivative according to claim 30 ~~or 31 in which~~ wherein R_3 is a hydrogen atom or a methyl group, or its hydroquinone form or a pharmaceutically acceptable salt thereof.

33. The benzoquinone derivative according to claim 30, ~~31, or 32 in which~~ wherein Z is



and n is an integer 1 or 3, or its hydroquinone form or a pharmaceutically acceptable salt thereof.

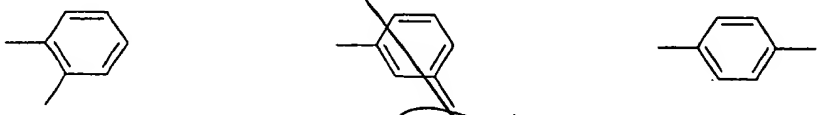
34. The benzoquinone derivative according to ~~any one of~~ claims 30 ~~to 33 in which~~ wherein R_4 is a group $-COOR_5$ wherein R_5 is a hydrogen atom, an optionally substituted alkyl group having 1 to 8 carbons, an optionally substituted phenyl group, or an optionally substituted aralkyl group having 7 to 11 carbons, or its hydroquinone form or a pharmaceutically acceptable salt thereof.

35. The benzoquinone derivative according to ~~any one of~~ claims 30 ~~to 33 in which~~ wherein R_4 is a group $-CONR_6R_7$ wherein R_6 and R_7 are each independently a hydrogen atom, an optionally substituted alkyl group having 1 to 8 carbons, an optionally substituted bicyclic unsaturated or partially saturated hydrocarbon ring group having 9 to 11 carbons, an optionally substituted heterocyclic group, an optionally substituted phenyl group, an optionally substituted aralkyl group having 7 to 11 carbons, or a heteroaryl-C_1-C_3-alkyl group, or R_6 and R_7, together with the nitrogen atom to which they are attached, represent a heterocyclic group which may further contain a nitrogen, oxygen and/or sulfur atom, or its hydroquinone form or a pharmaceutically acceptable salt thereof.

36. The benzoquinone derivative according to ~~any one of~~ claims 30 ~~to 33 in which~~ wherein R_4 is a group $-CONR_6R_7$ wherein R_6 and R_7, together with the nitrogen atom to which they are attached, represent a 5- to 10-membered optionally substituted, nitrogen-containing heterocyclic group which may contain, in addition to the carbon and nitrogen atom, 1 to 3 heteroatoms selected from the group consisting of a nitrogen, oxygen and sulfur atom, the carbon atom on said cyclic group being optionally a ketone form or the sulfur atom on said cyclic group being

optionally an oxide form, or its hydroquinone form or a pharmaceutically acceptable salt thereof.

37. The benzoquinone derivative according to claim 30, ~~34, 35, or 36 in which~~ wherein R_1 and R_2 are a methyl group or a methoxy group; R_3 is a methyl group: R_4 is a carboxyl group which is optionally esterified or amidated; Z is



and n is an integer 1 or 3, or its hydroquinone form or a pharmaceutically acceptable salt thereof.

add D5

add G1